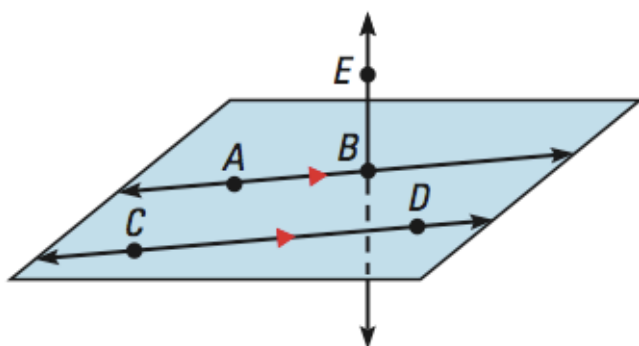
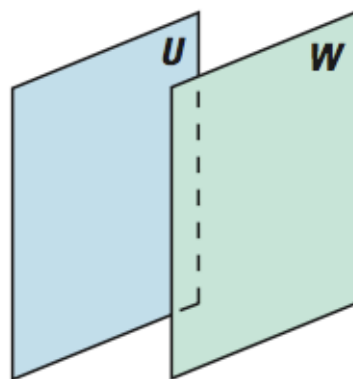


Pre-AP Geometry Date _____ 3.1 Notes
Lines and Angles (pp 129–131)

Two lines are **parallel lines** if they are coplanar and do not intersect. Lines that do not intersect and are not coplanar are called **skew lines**. Similarly, two planes that do not intersect are called **parallel planes**.



\overleftrightarrow{AB} and \overleftrightarrow{CD} are parallel lines.
 \overleftrightarrow{CD} and \overleftrightarrow{BE} are skew lines.



Planes U and W are parallel planes.

To write “ \overleftrightarrow{AB} is parallel to \overleftrightarrow{CD} ,” you write $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$. Triangles like those on \overleftrightarrow{AB} and \overleftrightarrow{CD} are used on diagrams to indicate that lines are parallel.

Segments and rays are parallel if they lie on parallel lines. For example, $\overline{AB} \parallel \overline{CD}$.

PARALLEL AND PERPENDICULAR POSTULATES

POSTULATE 13 *Parallel Postulate*

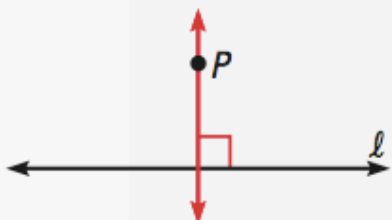
If there is a line and a point not on the line, then there is exactly one line through the point parallel to the given line.



There is exactly one line through P parallel to ℓ .

POSTULATE 14 *Perpendicular Postulate*

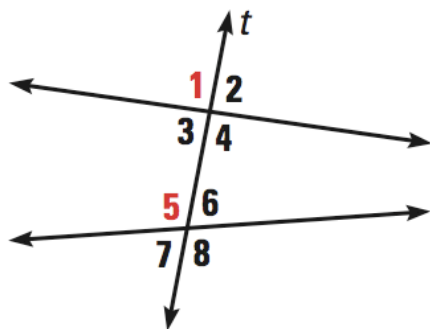
If there is a line and a point not on the line, then there is exactly one line through the point perpendicular to the given line.



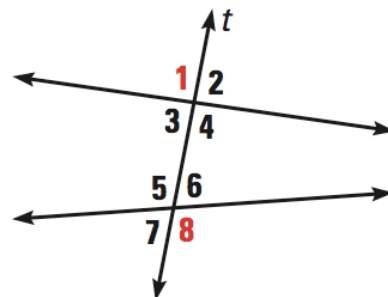
There is exactly one line through P perpendicular to ℓ .

Pre-AP Geometry Date _____ 3.1 Notes
Lines and Angles (pp 129-131)

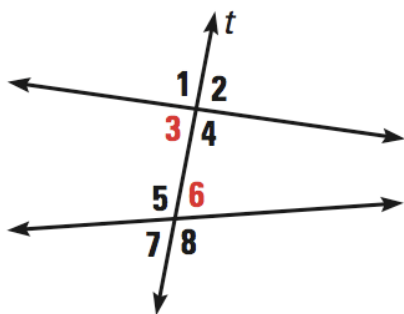
A **transversal** is a line that intersects two or more coplanar lines at different points. For instance, in the diagrams below, line t is a transversal. The angles formed by two lines and a transversal are given special names.



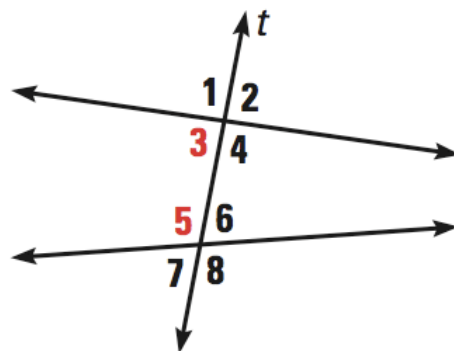
Two angles are **corresponding angles** if they occupy corresponding positions. For example, angles **1** and **5** are corresponding angles.



Two angles are **alternate exterior angles** if they lie outside the two lines on opposite sides of the transversal. Angles **1** and **8** are alternate exterior angles.



Two angles are **alternate interior angles** if they lie between the two lines on opposite sides of the transversal. Angles **3** and **6** are alternate interior angles.



Two angles are **consecutive interior angles** if they lie between the two lines on the same side of the transversal. Angles **3** and **5** are consecutive interior angles.

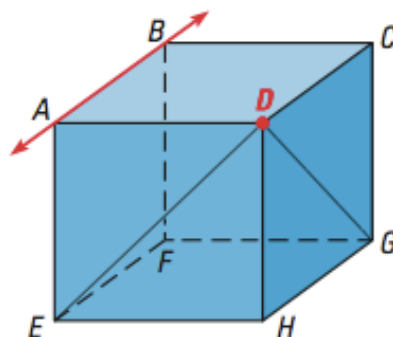
Consecutive interior angles are sometimes called same side interior angles.

Pre-AP Geometry Date_____ 3.1 Notes
Lines and Angles (pp 129–131)

EXAMPLE 1 *Identifying Relationships in Space*

Think of each segment in the diagram as part of a line.
Which of the lines appear to fit the description?

- parallel to \overleftrightarrow{AB} and contains D
- perpendicular to \overleftrightarrow{AB} and contains D
- skew to \overleftrightarrow{AB} and contains D
- Name the plane(s) that contain D and appear to be parallel to plane ABE .



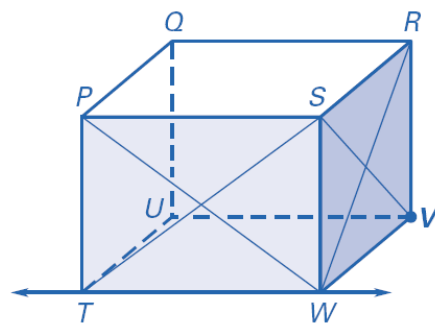
SOLUTION

- \overleftrightarrow{CD} , \overleftrightarrow{GH} , and \overleftrightarrow{EF} are all parallel to \overleftrightarrow{AB} , but only \overleftrightarrow{CD} passes through D and is parallel to \overleftrightarrow{AB} .
- \overleftrightarrow{BC} , \overleftrightarrow{AD} , \overleftrightarrow{AE} , and \overleftrightarrow{BF} are all perpendicular to \overleftrightarrow{AB} , but only \overleftrightarrow{AD} passes through D and is perpendicular to \overleftrightarrow{AB} .
- \overleftrightarrow{DG} , \overleftrightarrow{DH} , and \overleftrightarrow{DE} all pass through D and are skew to \overleftrightarrow{AB} .
- Only plane DCH contains D and is parallel to plane ABE .

Examples

Think of each segment in the diagram as part of a line. Which of the lines appear to fit the description?

- Parallel to \overleftrightarrow{TW} and contains V .
- Perpendicular to \overleftrightarrow{TW} and contains V .
- Skew to \overleftrightarrow{TW} and contains V .
- Name the plane(s) that contain V and appear to be parallel to plane TPQ .



Pre-AP Geometry Date_____ 3.1 Notes

Lines and Angles (pp 129–131)

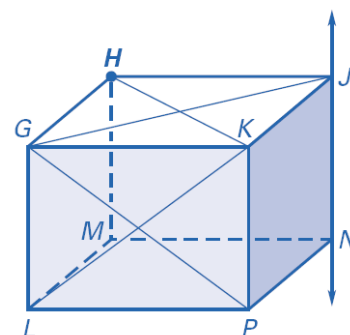
Think of each segment in the diagram as part of a line. Which of the lines appear to fit the description?

5. Parallel to \overleftrightarrow{JN} and contains H.

6. Perpendicular to \overleftrightarrow{JN} and contains H.

7. Skew to \overleftrightarrow{JN} and contains H.

8. Name the plane(s) that contain H and appear to be parallel to plane LMN.



EXAMPLE 2

Identifying Angle Relationships

List all pairs of angles that fit the description.

a. corresponding

b. alternate exterior

c. alternate interior

d. consecutive interior

SOLUTION

a. $\angle 1$ and $\angle 5$

b. $\angle 1$ and $\angle 8$

$\angle 2$ and $\angle 6$

$\angle 2$ and $\angle 7$

$\angle 3$ and $\angle 7$

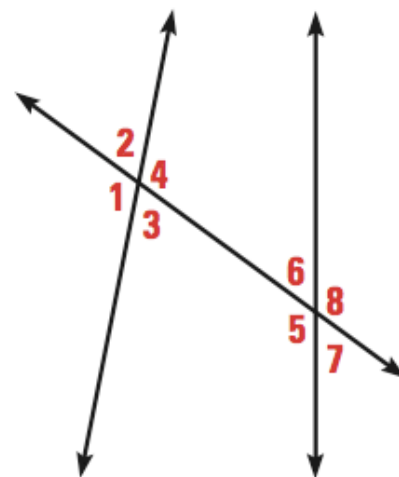
$\angle 4$ and $\angle 8$

c. $\angle 3$ and $\angle 6$

d. $\angle 3$ and $\angle 5$

$\angle 4$ and $\angle 5$

$\angle 4$ and $\angle 6$

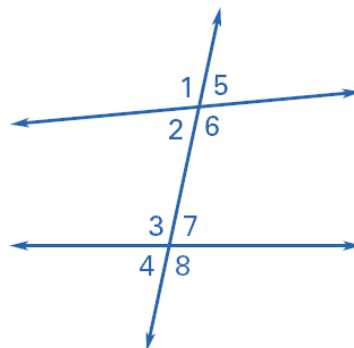


Pre-AP Geometry Date_____ 3.1 Notes

Lines and Angles (pp 129-131)

List all pairs of angles that fit the description.

9. Corresponding:



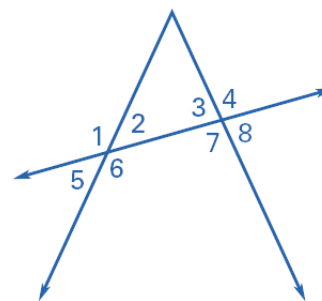
10. Alternate Exterior

11. Alternate Interior

12. Same-side interior

List all pairs of angles that fit the description.

13. Corresponding



14. Alternate Exterior

15. Alternate Interior

16. Same-side interior

17. How are skew lines and parallel lines alike? How are they different?